AVIATION

The Oldest American Aeronautical Magazine

AUGUST 4, 1924 Issued Weekly PRICE 10 CENTS

French woman parachute jumper leaving airplane in a public demonstration

VOLUME XVII

NUMBER 5

SPECIAL FEATURES

THE 15TH ANNIVERSARY OF OUR AIR SERVICE

A NEW TYPE OF ENGINE FOR LARGE AIRCRAFT

THE GLENN L. MARTIN MODEL 70 COMMERCIAL PLANE

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AVIATION

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Henry Ford and the Airplane

COLLIER'S prints an interesting interview with Henry Ford in which he definitely announces a personal connection with aircraft development In discussing the importance of nitrates, he says.

"The last war showed that the next war is going to be won in the air and with high explosives. All the nations are working on these two points. We here in the United States can easily learn to build the best airplanes in the world. There are no more problems in an airplane than there were in the automobile. We have not given airplanes a thousandth part of the attention that we have given to automobiles.

"We thought we could learn all there was to know about airplanes in a few months, and we made a great many mistakes But also we learned a great deal from our mistakes. A man working on a new subject has to make a great many mistakes We can find out how to make and to manage anything that is mechanical. Training air pilots is another matter

"But the point about airplanes is that in making them we do not have to go outside our own country for any of the materials We are lending some of our ground at Dearborn for an aviation field and putting up a hangar for experiments with all metal planes and airships, and we intend to give the aid of our own people in working out the best and most economical forms of airplanes They can be commercially developed as soon as they are taken up in a commercial way. As soon as we know as much about them as we do about automobiles—and that will not be long—then they can be built by the thousands or by the millions."

We have known for some time that the Ford interests were behind the Stout and Upson airplane and airship developments, but never before has it been announced publicly

Mr Ford, with his usual optimism, sees the day "and that will not be long" when aircraft will require license plates bearing seven figures. At this time, after twenty years of development, when there are only a few hundred airplanes built in this country every year, we regard it as a hopeful sign that the peer of all production manufacturing should become personally interested in aircraft to the extent of having a factory on his grounds near his home at Dearborn.

Congressional Aircraft Committees Needed

EVER since the War, there has been a general demand for Special Committees in the House and Senate to consider aircraft development. Every other important activity of the Government has a special committee to study and investigate its progress Even the objection that the use of aircraft is under the direction of the War, Navy and Post Office Departments and therefore should come under their committees does not hold as will be evident from some of the present committees such as The Census, Civil Service, Coins, Weights and Measures, Education, Public Buildings, Flood Control, Immigration and Naturalization, Indian Affairs, Industrial and Arts Expositions, Insular Affairs, Irrigation and Reclamation, Merchant Marine and Fisheries, Mines and Mining, Patents and Pensions, Railways and Canals. Many of these matters are directly under existing departments for executive direction, but for legislative consideration Congress has special committees that are charged with keeping records and holding hearings on matters pertaining to their particular fields.

Under existing conditions, where there are such wide differences of opinion in the Navy Department as to the extent to which aircraft may be used and their comparative value, and where in the War Department the older officers are so frankly outspoken in the deprecatory opinion of the employment of our Air Services, where the coast artillery and fortifications problems are diametrically opposed to the aerial doctrine, it can hardly be expected that aeronautics can be discussed with any degree of frankness or freedom before the Naval or Military Affairs Committees. It takes a courageous officer to appear before a Congressional Committee and differ with his superiors—he becomes a marked man for so doing

As AVIATION pointed out earlier this year, the Government is spending more for its aircraft activities than many of the Departments and yet aside from a few hours before Senators and Representatives who only have a superficial knowledge of aerial necessities, aircraft receives little consideration from Congress.

Even more important than the absence of careful consideration by Congress is the fact that usually only officers appear before these committees. Civilians who have made an intensive study of aerial necessities for many years are never called upon for their views with the result that when matters become acute, a special investigation committee is appointed, the routine work of our air services is interrupted and as is usually the case scandalous charges overshadow constructive suggestions If there were committees before which civilians interested in aircraft could go at any time and make suggestions or complaints there would be little reason for the repeated investigations which usually go over and over the same old ground

The change in the method of handling appropriations places the responsibility for all appropriations upon the Appropriations Committee This leaves Aircraft Committees free to consider air policies and problems with entire freedom from the limitations of opportunism At the present time only governmental aircraft problems are considered, there is no consideration being given to civilian flying which should be one of the most valuable aids to the government in time of need

The third suggestion of a National Air Policy is so obviously sound that it must take the place of one of the foundation stones of any aerial policy arch

The 15th Anniversary of Our Air Service

On July 30, 1909, the Army Accepted the First Military Airplane

By ERNEST L. JONES

Fifteen years ago the United States inaugurated its air service with 1 plane, 1 airship and 2 balloons. The longest airplane flight was an hour and the speed 42 mi.

This is an anniversary year. AVIATION recalls the great exploits of a decade and a half ago, brings to mind forgotten lore and adds some long-buried facts of interest.—EDITOR.

Fifteen years ago, on the thirtieth of July, the Wright brothers finally delivered to Uncle Sam the world's first government flying equipment and took up the instruction of the world's first military airplane pilots. Orville Wright sold the machine and Wilbur trained the pilots—Lieuts. Frank P. Lahm, Benjamin D. Foulois and Frederic E. Humphreys, of the Cavalry, Infantry and Engineer corps respectively.

The First Military Airplane in the World. The Wright Model B at Fort Meyer surrounded by the pioneers of military aviation—Wright, Squier, Selfridge and Foulois.

On this 30, 1909, the United States became the proud possessor of the world's first military airplane. No one knew just what to do with it but it was there just the same, all paid for and everything, instruction included.

This is how it happened.

Specifications for a heavier than air gasless flying machine—the first specifications ever issued for such a thing—were issued by the Chief Signal Officer of the Army, Gen. James Allen, on Dec. 23, 1907, shortly after the return of Maj. George O. Squier from a tour of European air centers, such as they were.

The advertisements invited proposals from all inventors and manufacturers, to be opened Feb. 1, 1908.

Bidders were asked to submit scale drawings of their craft, describe the power plant, state speed for which designed, surface area, weight and material. Quick demountability was a desideratum. The machine had to carry two persons of a combined weight of 350 lb., with sufficient fuel for a flight of 125 mi. and have a speed of 40 mi./hr. in still air.

A premium of 10 per cent of the contract price was to be paid for each additional mile per hour of speed over 40, with a similar deduction for each mile of less speed. An endurance flight of at least one hour was required, the machine to land in condition to at once start on another flight, and demonstrate steering in all directions without difficulty and be at all times under perfect control and equilibrium. The machine had to be so designed as to permit ascending in any country encountered in field service and landing undamaged in a field without requiring a specially prepared spot.

The price quoted was to include the instruction of two men in the handling and operation of this flying machine.

Status Abroad

At this time the world was watching the short flights of Blériot, Santos Dumont, Delagrange, Pelterie, Ferber and a few others and Farman was hoping to win the Deutsch Archdeacon prize for a flight of 1000 m. (3280 ft.).

Made publicly and in the presence of large numbers of people, among whom were newspaper correspondents, these foreign flights were the first to arouse world-wide interest despite the fact that the Wrights had flown years before—first, on Dec. 17, 1903; and in 1904 and 1905 at Dayton where some of these flights were witnessed by neighbors.

The accounts of the Wright gliding experiments of 1900-1902 created renewed interest in Europe in this age-old question and various experimenters obtained renewed hope.

The account of the power flights published in France in *Aerophile* in December, 1905, created a sensation there when the Wrights told of flights of 11 to 24 mi., and many more took up experiments with renewed zeal.

In America

The press, however, more or less doubted the flights of the Wrights, despite the March, 1906, announcement of the Aero Club of America that after an investigation it was convinced of the entire accuracy of the Wrights' statements.

The Wrights had made no flights from the Fall of 1905 until the Summer of 1908 and there was no one else flying in America.

So, beginning with the 25 yd. hop of Santos Dumont in September, 1906, the eyes of the whole public were focussed on the extremely short flights being made in France.

While the specifications of an airship, issued about the same time, presented no great difficulties, the consensus of opinion as to the flying machine requirements was that the government was asking too much. Public opinion didn't realize that the specifications were written around the exact performance claimed by the Wrights themselves.

Amazement at Specifications

Even *Aeronautics*, the only aeronautic journal of the day in America, said "the demands for a dynamic machine are of such a nature, the likelihood of the absence of practical hidden defects so great." It doubted the art had progressed far enough, called attention to the increase in the demands over what the Wrights had previously accomplished, and suggested that doubtless even the Wrights would not care to bid. There seemed to be no other possible bidder, at any rate, who could fulfill the conditions.

The New York *Globe* pessimistically remarked: "One might be inclined to assume from the announcement * * * that the era of practical human flight had arrived * * * but * * * a very brief examination of the conditions imposed and the reward offered for successful bidders suffices, however, to prove this assumption a delusion.

"A machine such as described in the Signal Corps' specifications would record the solution of all the difficulties in the way of the heavier-than-air airship (sic), and, in fact, finally give mankind almost as complete control of the air as it now has of the land and water. It would be worth to the world almost any number of millions of dollars, would certainly revolutionize warfare and possibly the transportation of passengers; would open to easy access regions hitherto inaccessible except to the most daring pioneers, and would, in short, be probably the most epoch-making invention in the history of civilization."

Wilbur Wright visited the War Department on his way back to Dayton from demonstrating the airplane in Europe when the Signal Corps made its announcement, the first call for flying machine bids ever issued by any country in history. Can there be any doubt but that General Allen wrote Wright's own claims into this historical document, possibly with his own doubts of fulfillment?

Opening of the Bids

On Feb. 1, 1908, the proposals for the Signal Corps' flying machine—no one doubted but that the airplane was the sole possibility—was opened and on Feb. 8 the Secretary of War approved the recommendations of the Board of Ordnance and Fortification, out of whose funds payment, if any, would have to be made, and accepted the offers of A. M. Herring, of New York, $20,000; James F. Scott, of Chicago, $1000; Wright Brothers of Dayton, $25,000. Contracts were subsequently signed with the Wrights and Herring.

Neither of the first two mentioned ever delivered a machine for trial. Herring obtained several extensions of the time limit and claimed to actually have under construction something in the way of a machine. Finally the Herring contract was cancelled by the Government, in August, 1909. The activities of Scott remain a mystery to this day.

Twenty-two bids in all were received within the time limit, as follows:

George W. Schultz	$30,000	Chas. M. Wanner	$1,000,000
Brown & Swingle	5,450	A. M. Barker	650
B. G. Dressler	5,000	A. E. Meline	1,380
O. M. Preston	20,000	Jno. M. Kairies	20,000
A. F. F. Stoney	10,000	E. H. Young	5,000
W. R. Gordon	$40, $50 and $65 per lb.	Fred C. Schwartz	10,000,000
		Wm. Harper Jr.	20,000
L. J. Brown	15,000	Frank & Hedden Co.	500
Jas. F. Cavanaugh	55,000	Chas. B. Nichols	52,500
J. J. F. Boatman	$7,000	A. W. H. Griepe	25,000
per ton lifting capacity, 1 1/2 tons		James F. Scott	1,035
	Wright Brothers $25,000	A. M. Herring	20,000

Even considering the state of the art of 1907-8, it does not seem conceivable that any bidder—proposing seriously to produce a machine the world had never before seen could have been so entirely ignorant of the simplest ideas of construction, as evidenced by a perusal of the proposals themselves.

One bidder stated his machine would sustain itself in the air without any machinery whatever and ascend from any ordinary place, either in calm or storm.

Only thirty days were required by one bidder to deliver his machine, while another thought five years ought to be allowed, but it was a big undertaking.

The condition of assembly in one hour seemed almost impracticable to another bidder who said: "This invention marks the most difficult and dangerous application of power and while it will more than fulfill requirements it can not be disconnected or rebuilt in an hour."

A speed of 100 mi./hr. seemed to be attractive, for more than one offered to exceed the 40 mi. required.

One man, whose bid was extremely low, specified:

"Speed 100 m. per hour (are planes silk aluminum bands steel wires & paper). Surface of Airplanes two 7 x 11 ft., two 6 x 9 ft., one 9 x 16 drive plane. Four sails 8 x 15 ft., three ground wheels, two gayro scope wheels, one blowir, speed 1000 r.p.m. weight of machine, engine and everything complete ready for flight with two men, 700 lbs. * * *."

Rather more extensive was the ambition of another who offered for about the price of a 1924 model big bomber an "airship carrying 15 men at a speed of 40 miles an hour, fuel for 3 days, with a 25 h.p. motor."

This is rather better than the record up to date. But, as the inventor wrote on his bid, "Bei Gott sind alle Dinge moglich"—and maybe he's right.

The First Airplane Contract

On Feb. 10, 1908, contract was entered into between Capt. Charles S. Wallace, of the Signal Corps, U. S. Army, "of the first part," and "Wilbur and Orville Wright, trading as Wright Brothers, of 1127 West Third Street, Dayton * * * of the second part," for delivery to the United States of America "one (1) heavier-than-air flying machine in accordance with Signal Corps Specifications No. 486, dated December 23, 1907," for $25,000. Complete delivery to be made on or before Aug. 28, 1908.

The signatures on the document are those of Captain Wallace, "Wright Brothers by Orville Wright," and James Allen, Brigadier General, Chief Signal officer of the Army. The witnesses are John J. Mullaney and Albert Lariviere, for the government, and C. E. Taylor and H. L. Hoffman for the Wright Brothers.

Everyone connected with the early days of flying will recall Lariviere, a War Department clerk, now dead, and Charlie Taylor, the world's first airplane mechanic. Mullaney still enjoys a good story as chief clerk of the present day Air Service and Hoffman is recalled as a neighbor of the Wrights.

Wrights' Preliminary Flights

In preparation for the fulfillment of the Army contract and of obligations abroad, the Wrights resumed flight trials on the same grounds where gliding experiments were conducted in 1900-1902 and where the world's first controlled power flight was made in 1903—Kitty Hawk, N. C., a godforsaken strip of sand amid noisome swamps and jungle, the abode of moccasins, rattlers and blacksnakes, ground ticks, jiggers, wild turkey and hogs, ten miles or so across Roanoke Sound from the nearest habitation, Manteo. Here, on Roanoke Island, was made, in 1585, the beginning of Anglo-Saxon civilization in the western hemisphere by Sir Walter Raleigh. Here was born the airplane.

Did I say "secret,"—yes, all but for five correspondents who bid themselves among the jiggers and observed in the far distance a speck of something flying in the air. Byron R. Newton of the *New York Herald*, later Assistant Secretary of the Treasury and Collector of the Port of New York, was one of these, and he wrote me a story of his experiences which stands as a great human document. Like his namesake, Newton discovered something, for Byron believed the Wrights could really fly. "Jimmy" Hare, the famous war photographer, was there and caught a miniature image on the film—and so the world at least believed in the Wrights.

From May 6 to 14 some thirteen flights were made, in the old machine of 1905. The means of control remained the same but the position of the elevator and combined rudder-and-warping levers and their direction of motion were altered in order to permit the operator to take a sitting position. A seat for a passenger was also added. The engine of 1905 was replaced by a later model, one of which was exhibited at the aero show in New York in 1906. Larger gas tank and radiators were also installed, and the engine was placed in a vertical position.

(Concluded next week)

A New Type of Engine for Large Aircraft

By GLENN D. ANGLE

Among the various applications of the internal combustion engine, there are none which show such diversity of form as those employed in aircraft. Freakish as many of these may have seemed when they first made an appearance, still their existence could generally be justified in view of the rather special characteristics that are quite essential in a first class aircraft engine. Some of these engines have come to be regarded as conventional types even after one or two more or less successful applications. On the other hand, there have also been designs of various sorts—some of which never existed beyond the drawing stage—that are definitely obsolete as far as the present requirements of aircraft are concerned, and yet we have every reason to believe they were proposed with a profound belief that in one way or another they would prove superior to all others existing at that time, at least for some specific purpose. With the exception of the radial and rotary engines, the ones which have been mostly used, and are therefore accepted as strictly conventional designs, are the six-cylinder vertical, eight-cylinder Vee, and the twelve-cylinder Vee types.

The W Types

Although the W types, which consist of three rows of cylinders, have not been used to such a large extent as the engines mentioned above, they have nevertheless begun to be classed among the conventional arrangements because of the several quite successful designs of this form. At present we find twelve-cylinder engines composed of three rows of four cylinders, in which each outer row is inclined at 60 deg. to the vertical row in the center, being an arrangement which obviously gives even periods between impulses. Similar results have been obtained in the W types composed of rows having either six or eight cylinders in line, but in each case, of course, the angle separating their respective axis must be correctly chosen.

The eighteen cylinder engine, with three rows of six cylinders each, has so far appeared in just one form, and in this arrangement the outer rows are both inclined 40 deg. with respect to the vertical row in the center, thus giving even firing intervals of 40 deg. of crankshaft rotation when using the conventional six-throw crankshaft having crank-pins spaced 120 deg. apart. Upon further investigation, however, we find that there are also two other possible arrangements which satisfy the same conditions, and it is primarily the object of this article to drew attention to the more important features that one of these types possess.

The least interesting of the two eighteen-cylinder designs should in all strictness, be classed as a Y type, because when two of the rows are arranged to form a 40 deg. Vee, the third row extends vertically downward, that is, its angular distance to either of the other rows is 160 deg. It is needless to explain the inferiority of an engine with cylinders so disposed as compared to any of the W forms other than to direct attention perhaps to the excessive frontal dimensions which alone might prohibit its use in aircraft.

Superiority of W Forms

The other arrangement for three six in line rows of cylinders giving even firing periods differs mainly from the one first described by the angle between the center vertical and the two outer rows which is now 80 instead of 40 deg. The salient features of this special W form will now be presented by drawing attention to its advantages over the eighteen-cylinder 40 deg. W type and the twelve-cylinder 60 deg. Vee type of equal piston displacement.

Before dealing with the features of the 80 deg. W type engine of eighteen cylinders, however, we should first determine the best order of firing. Assuming that each row of six will fire 1 - 5 - 3 - 6 - 2 - 4, which is generally conceded to be preferred since it is the only sequence where the impulses alternate each side of center, we find that the best firing order, designating the left, center, and right rows as L, C, and R, respectively, would then be

1L - 4R - 6C - 5L - 1R - 2C - 3L - 5R - 4C
6L - 3R - 1C - 2L - 6R - 5C - 4L - 2R - 3C

One reason this firing order is chosen in preference to any of the others that it is possible to employ, is because it gives well distributed impulses along the longitudinal axis of the engine. Another very important reason is the greater time allowed between high load periods on each crank-pin. When

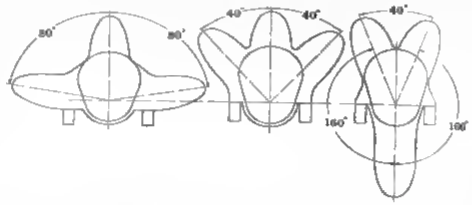


Fig. 1. Possible arrangement of the three rows of six cylinders giving even firing intervals

two high load periods occur close together, the maximum load may be appreciably increased, on the other hand, the bearing loads will be no more severe than if a single impulse occurs during each cycle should the two be sufficiently separated. With an interval allowed between the occurrence of any two high load periods on the crank-pin, an opportunity is also afforded to replenish the oil film between the crank-pin and its bearing, thereby greatly improving the lubricating possibilities.

The minimum possible interval between impulses on the crank-pin of an eighteen-cylinder 40 deg. W type engine is 80 deg. of crankshaft rotation, while it is seen from the above firing sequences that this interval is 180 deg. in the 80 deg. W type. The crank-pin load conditions and the ability to provide satisfactory lubrication are therefore much improved in the case of the latter cylinder arrangement. The importance of this consideration depends, of course, upon conditions, including in the main the relative amount of care required in the design of crank-pin bearings.

Important Design Factors

In taking up some of the more important design factors for judging the advantages in the type, let us first regard frontal area. This is always an important consideration in an airplane engine, being more important in some installations than in others, depending upon the requirements.

The frontal area is greatly effected by the height of the cylinders above the crank axis, and the height in turn is often controlled by the angle included between cylinders of any given bore and stroke. Naturally the greater the angle, the closer the inner ends of the cylinder barrels may be located with respect to the crank axis, the limit in this case being determined by the minimum practical length of connecting rod. There are limits to the distance that a piston can over-run the cylinder at the lower end of the stroke, consequently the rod must be made longer as the length of the stroke is increased. For every set of conditions there appears to be a fixed minimum rod/stroke ratio which decreases with an increase in stroke/bore ratio, and is different, of course, with a change in the distance to the lower end of the cylinder barrel from the crankshaft axis as affected by the angle between adjacent cylinders. These relations are shown for different included angles between cylinders in Fig. 2.

Although the connecting rod will become longer for any stroke with an increase in cylinder bore, and naturally the height of the cylinder will increase as well, we find that both the length of the rod and the height of the cylinder will actually be less in proportion to the total piston displacement of the

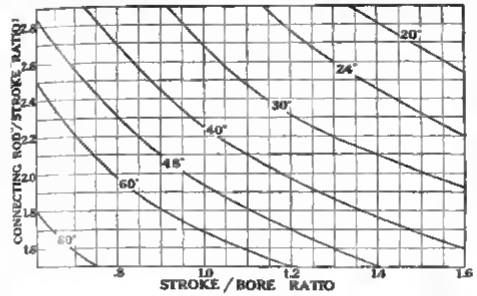


Fig 2. Relationship of stroke/bore and connecting rod/stroke ratios at different included angles between cylinders

engine. Evidently the frontal area per unit of piston displacement will tend to decrease as the stroke/bore ratio is reduced, and from Fig. 3 we can at once see that, due to the larger angle included between cylinders in the new W type engine, the rate of gain in decreased frontal area per unit of piston displacement with lowering stroke/bore ratios is much more pronounced than in either the twelve-cylinder 60 deg. Vee type or the eighteen-cylinder 40 deg. W type engines. It is also shown that the frontal area in all types is proportionally less as the piston displacement is increased.

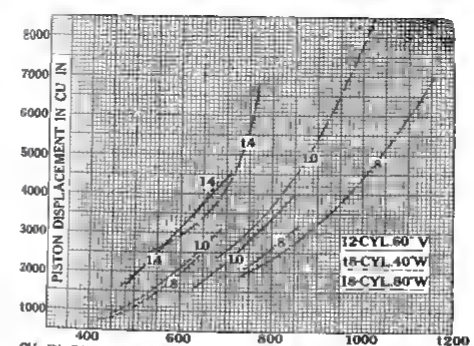


Fig 3. Frontal area/displacement characteristics of three types of engines

The values used in plotting the curves on this chart were obtained graphically. A certain particularly compact overhead valve gear design was laid out for each example at heights above the crankshaft axis, that were fixed by the minimum practical connecting rod/stroke ratio, except for such cases where 1.6 was chosen for all ratios that might fall below this figure. It is to be expected, of course, that the frontal area may be appreciably affected by changes in either of the above, but these curves at least quite closely show the relative frontal area characteristics for the three types. The present values are basic, that is, they only take into account the area represented by the cylinders and crankcase, and we must therefore expect a rather wide variation in frontal areas among engines using different types of manifolds, carburetor mountings, and the like. However, no great error is involved by the assumption that these will run fairly constant and they can therefore be disregarded for the present examples.

It is interesting to note that for most any piston displacement, the eighteen-cylinder 80 deg. W type engine shows inherently more piston displacement per square foot of frontal area at the same stroke/bore ratio. Apparently an engine of much greater piston displacement may be obtained in the 80 deg. W type for a given frontal area, and this becomes even greater as we take advantage of the wide angle between cylinders and reduce the stroke/bore ratio.

Neglecting for the present the slight differences in cylinder performance which might be affected by the bore and stroke dimensions, we must also recognize the fact that the short stroke gives lower piston speeds for any given engine speeds. As piston speeds are generally regarded as a rough measure of piston inertia forces, it is evident that, for a given piston displacement, the engine having the lower stroke/bore ratio

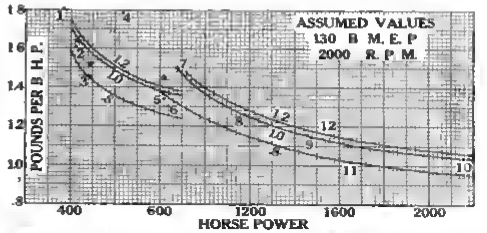


Fig 4. Weight per horsepower characteristics in the 12 cyl 60 deg. V type and 18 cyl. 80 deg. W type engines

	NAME		BORE AND STROKE (IN.)	STROKE/BORE
1	Curtiss D12	Actual	5.500 x 6.000	1.550
2	Packard 1336	Actual	5.125 x 6.375	1.053
3	Packard 1586	Actual	5.375 x 6.500	1.384
4	Wright T3	Actual	5.750 x 6.860	1.925
5	Packard 2500	Estimated	5.875 x 6.500	1.660
6	18 Cyl. 50° W	Proposed	6.000 x 5.000	0.833
7	18 Cyl. 50° W	Proposed	5.750 x 6.750	1.090
8	18 Cyl. 60° W	Proposed	6.750 x 6.500	1.040
9	18 Cyl. 60° W	Proposed	6.750 x 6.750	1.000
10	18 Cyl. 80° W	Proposed	7.875 x 7.875	1.000
11	18 Cyl. 80° W	Proposed	7.625 x 8.375	1.098
12	18 Cyl. 80° W	Proposed	6.437 x 7.843	1.000

would be capable of running at somewhat higher speeds without introducing any additional load on the crankshaft bearings. Then too, it is less difficult to employ valves of sufficient size to pass the charge required for any piston displacement—even at higher speeds—if the cylinder bore is relatively large as compared to the stroke of the piston. It therefore appears that the 80 deg. W type offers great possibilities as a high speed engine of any piston displacement when advantage is taken of the reduced stroke/bore dimensions.

If the stroke/bore ratio is reduced in an engine of any given piston displacement, it means that the cylinder bore is relatively larger, and as a result the overall length of the engine is increased. As one of the prime requisites of an airplane engine is short overall length, we must gage the reduction in frontal area by the effect upon these other important dimensions. It is generally found, however, that this increase is not a serious matter just so long as it does not involve added weight.

A study has been made of the influence upon the weight of both the twelve-cylinder 60 deg. Vee type and the eighteen-cylinder 80 deg. W type of various piston displacements by a change in stroke/bore ratio. The results are shown by the curves of Fig. 4. Briefly, the weight per horsepower reduces with an increase in piston displacement, and the lowest values are found with the lowest stroke/bore ratio considered.

Without complete designs, it is obviously very difficult to obtain accurate weight estimates of an engine, yet this investigation was conducted to a point where the errors would be

practically negligible. A certain particularly light form of construction was considered for each example so that the results would at least be comparative. On this chart are points representing actual engines of a different type of construction, and it is interesting to note how closely most of them fall on the curves.

Weight Characteristics

As a means of examining the weight characteristics to better advantage, the displacement of every engine has been converted into terms of horsepower on the basis of 130 lb. per sq. in. brake mean effective pressure and 2000 r.p.m. We can readily determine, of course, what the variation would be with a change in either of these values. The designs considered all employ directly driven propellers, geared propeller drives would perhaps increase these values about 0.2 lb./hp., although the latter is also subject to considerable variation with power output and speeds, as well as depending to a large extent upon the design.

The curves for the twelve-cylinder engine extend beyond what is considered practical outputs for this type, therefore without a more detailed study of some complete designs, it could hardly be said that the weight characteristics are better than the 60 deg. W type within this narrow range. It is very likely that the curves would be more nearly continuous in the average case. It is quite clearly shown that the weight per horsepower is reduced as the piston displacement is increased, and this tendency would probably be found also in engines of most every type, if the factors influencing weight, such as type of construction, speed, mean effective pressure, and stroke/bore ratio were to remain constant in every case. It is unlikely, however, that any of these engines would prove to be so inherently light as the 80 deg. W type between a range of outputs from 800 to 2000 hp. Without the least sacrifice to life and durability, eighteen-cylinder 80 deg. W type engines of 1500 to 1800 hp. can be built around a pound per horsepower.

Curves are not shown for the 40 deg. W type, but a preliminary study developed the fact that, for every set of conditions, such designs could not possibly be built so light. Moreover, the advantages in this arrangement are not apparent much above 1200 hp. for reasons already explained.

From the facts herein presented, there can be no doubt as to the advantages of the eighteen-cylinder 80 deg. W type engine over one having 40 deg. between the rows of cylinders. It has been explained that the loading on the crank-pin is not so severe, and the frontal area and weight per horsepower should be less with engines of equal piston displacement. The new arrangement offers possibilities in the high speed types, and this in itself is unusually interesting because the future development of light aircraft engines is headed in that direction. Besides these outstanding features, one cannot overlook the fact that the larger angle between cylinders affords much greater ease for installing carburetors, intake manifolds, or any other parts which are usually attached to the exterior of an engine.

There would be no good reason for building an engine with eighteen cylinders to give less than 600 hp. Between 600 and 800 hp. the 80 deg. W type engine would probably be on a par with the twelve-cylinder 60 deg. Vee type on the basis of weight per horsepower, but this new engine would undoubtedly show slightly less frontal area, as well as less overall length,

Evenness of Torque

at an equal piston displacement. The most important feature perhaps is the greater evenness of the torque delivered, this as a result of a larger number of cylinders. The same may be said of course in comparing the twelve-cylinder engine with the eighteen-cylinder 40 deg. W type, and it certainly is of no minor consequence. The cylinders for such outputs have reached fairly large dimensions and the roughness in running naturally becomes more pronounced than in smaller twelve-cylinder engines, especially at high engine speeds.

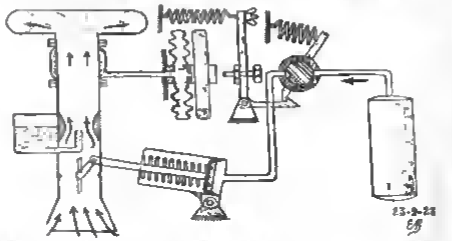
The broad expanse between the outer rows in this new type might lead one to believe that it would become excessively wide. This, however, is not the case when compared to the other two types on the basis of equal piston displacement. After a most careful study of this design from every angle, it must be concluded that it possesses the characteristics most desired in an aircraft engine, and should therefore be regarded very favorably for all future developments between 600 and 2000 hp.

The New Minimax Fire Extinguisher

The French "Service Technique de l' Aéronautique" recently conducted official tests of the fire extinguishing system devised by Emile Bechard and built by the Minimax Fire Extinguisher Co. of 4 rue Huntzager, Clichy (Seine), France.

The basic idea of the extinguisher is the utilization of the pressure generated by a gas which is heated by the beginning of the fire.

The gas expanded by the heat of the fire displaces a liquid which actuates a piston as in a hydraulic pump, the piston in turn opening a valve which is connected with a compressed air tank. The compressed air, working through pistons and levers, performs the following operations: (1) Closes the throttle, (2) Cuts off the ignition, (3) Cuts off the gasoline supply, (4) Closes the shutters on the radiator or on the engine hood, (5) Sprays the fire extinguishing liquid, (6) Empties the gasoline from the carburetors (Fig. 1).



Diagrammatic sketch, showing principles of the new Minimax fire extinguisher for aircraft use

Closing the throttle instantaneously cuts off the fuel supply, chokes the fire by the rarefication of the gases in the cylinders, cuts off the suction which might fan a fire in the carburetor, and eliminates the source of the fire if it is due to a blown out spark plug, a broken piston or connecting rod. When the throttle is closed, the motor does not suck in the fire extinguishing liquid. Shorting the magnetos eliminates the relighting of the fire, while cutting off the gasoline eliminates the fire's fuel supply.

The closing of the radiator shutters and of the motor hood shutters cuts off the forced air draft and the fire extinguishing liquid works in a closed space with maximum efficiency.

The projection of the fire extinguishing liquid is done by a special rotary spray which covers the whole surface of the motor. The liquid produces a dense vapor which rapidly chokes the fire. A valve can be arranged to drain the carburetors.

Tests were conducted with gasoline soaked rags which were placed around the motor and ignited either by electricity or backfiring. It was found that the fire was completely extinguished in from 7 to 15 sec., and that there was enough compressed air to make the apparatus work three times without recharging, and six times without renewing the fire extinguishing liquid. About a quart of this liquid is used to extinguish a fire. The demonstration apparatus tested by the "Section Technique" successfully functioned 130 times in succession.

The main advantages claimed for the apparatus are that it will function automatically before the fire has gained headway, that it extinguishes the fire in whatever part of the motor it is located, and that it does not ruin the engine. In fact, the engine can be restarted immediately after the apparatus has functioned.

The Glenn L. Martin Model 70 Commercial Plane

A New Ship Designed for Either Cargo or Passenger Carrying

The Glenn L. Martin Model 70 Commercial airplane represents a very efficient combination of speed and load capacity. Equipped with the 200 hp. Wright model E4 engine, the ship has a high speed of 112 mi./hr., a landing speed of 45 mi./hr. with a pay load capacity of 750 lb. and a cruising range of 550 mi. A clear, enclosed cargo space of 28 cu. ft. is provided.

The engine mounting is of steel tube, with wood bearers.

The new Martin Commercial, Model 70, fitted with a 200 hp. Wright model E4 engine, which has a pay load of 750 lb. and a cruising range of 550 mi. at 100 mi./hr.

Provision is made in the cargo compartment for rapid installation of two comfortable passenger seats. When passengers are carried, the cowling over the middle part of the fuselage is replaced by a suitable cockpit-type of cowling.

This ship is a further development of the experimental night mail plane which the Glenn L. Martin Co. of Cleveland, Ohio, produced last summer for the U. S. Air Mail Service. The wings are entirely new, having about 65 sq. ft. less area, and the tail surfaces have been modified to correspond. Some thirty or forty minor changes have been made to improve the serviceability of the ship.

The landing speed is a little higher than that of the experimental mail plane, mainly for the reason that many pilots will not make use of slow landing speeds below 45 mi./hr., but instead will glide in and level off at about 50 to 60 mi./hr. As a result, a ship which will not stop flying until its speed has fallen to 38 or 40 mi./hr. becomes known as a "floater."

The new design was worked out by Lesslter C. Milburn, chief engineer of the Glenn L. Martin Co., and three of the new ships have been finished.

Construction

The fuselage is constructed of birch plywood supported by a spruce frame.

The wings are supported by birch plywood box-type spars with Martin trussed spruce ribs. They are covered with cotton and the leading edge is reinforced with plywood to the front spar. Glenn Martin No. 15 airfoil is used. The interplane struts are of streamline steel tubing and the strut connections are submerged in the struts. A 24 in. walk-board is fitted on the left-hand side of the fuselage. All members are designed to sustain eight times normal load.

The radiator is mounted below the Wright E4 engine where it receives the full blast of the slip-stream through an especially designed opening. The air flow, after passing through the radiator, is drawn out through louvers in the side and bottom of the cowl.

The landing gear is very substantially built and braced. It is made of steel tube and has a wide tread. The brace struts join the axle through a fork fitting which permits the shock absorber unit to be wound on the bench. 30 in. x 5 in. wheels are fitted.

Service Features

Particular attention has been paid to general serviceability. The engine cowling is provided with extra large doors on each side which are fastened with quick-opening spring latches. When the doors are opened the entire engine compartment is wide open and all connections of the oil and water system are conveniently reached.

The gasoline and oil filler spouts are outside of the body and are fitted with quick-opening caps.

A large manhole is provided in the middle of the bottom of the fuselage. This door is hinged and latched and can be opened at once to permit access to the entire inside of the fuselage back of the pilot.

The pilot's cockpit is exceptionally roomy and comfortable and affords excellent vision for all conditions of flying and landing.

The control system is extremely simple and is fitted with extra large pulleys and ball-bearings, resulting in easy and rapid operation. The rudder bar is provided with an adjustable tension to compensate for engine torque and slip-stream effects. The tail skid is steerable and is operated from the rudder foot-bar.

Anchor rings are provided at the wing tips for staking down the airplane out-of-doors. Rings are also provided in the top surface of each wing panel so that each panel can be swung into place during assembly.

Accurate spirit levels are built into the wings and fuselage to permit rapid rigging and adjustment at any time.

A locker is provided back of the pilot's seat for carrying a spare tire, suitcase, tools or other miscellaneous items. A space is left open behind the pilot's instrument board to permit the connection and disconnection of instruments without difficulty.

Successful Service Tests

These planes are being given commercial service tests by C. C. Caldwell, chief test pilot of the Glenn L. Martin Co. One of them has recently made trips from Cleveland to Chicago and also from Cleveland to New York and return. During the trip to New York, a severe wind and rain storm was encountered en route and the pilot chose to make a landing rather than lose his way. The landing was effected in a small field on plowed ground and after waiting for the storm to subside, the pilot took off and continued on his trip.

Pilot Caldwell reports very favorably upon the ease with which the ship can be handled and flown on cross-country trips. He has also pointed out that complete control is maintained without difficulty, throughout the whole flying range, and in landing.

SPECIFICATIONS OF MARTIN COMMERCIAL MODEL 70 PLANE

	Dimensions & Areas		
Span	38 ft	Weights	
Length	27 ft	Gross weight (full cargo)	3500 lb.
Height (overall)	12 ft	Weight empty with water	2100 lb.
Airfoil	Glenn Martin No. 15	Useful load	1400 lb.
Total wing area	385 sq. ft.	Gas capacity (normal) (84 gal.)	385 lb.
Stagger	16.5 in.	Cargo space (clear)	28 cu. ft.
Dihedral	3½	Per cent useful load	40 %
Chord (both)	84.5 in.	Performance	
Gap	58 in.	Maximum ground speed	112 mi./hr.
Aileron area (total of four)	70 sq. ft.	Landing speed (full load	45 mi./hr.
Rudder area	11.4 sq. ft.	Rate of climb at zero altitude	800 ft./min.
Fin area	9.11 sq. ft.	Altitude in 10 min.	6500 ft.
Elevator area	10.4 sq. ft.	Service ceiling	17000 ft.
Stabilizer area	28.2 sq. ft.	Cruising radius—80 gal. gas	550 mi.

U. S. Civil Service Examination

The U. S. Civil Service Commission announces an open competitive examination for the post of associate mechanical engineer (gases). Applications will be accepted until Aug. 19. The examination is to fill a vacancy in the office of the Chief of Air Service, War Department, Washington, D. C., and vacancies in positions requiring similar qualifications, at an entrance salary of $3,000 a year. Advancement in pay may be made without change in assignment up to $3,600 a year.

The duties of this position, under direction, are to develop improvements and supervise or conduct experimental tests on apparatus for the production, storage, purification and handling of helium, hydrogen and related gases. Applicants must be thoroughly familiar with at least several types of commercial air and liquefaction gas production plants, their operation and their equipment, and must have a knowledge of the purification and separation of gases by the liquefaction method, and the related work as required.

Competitors will be rated upon their education, training, and experience.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. Civil Service examiners at the post office or customhouse in any city.

Inverting the Liberty Engine

The idea is not strictly new. The Germans are credited with first having experimented with it—using not a Liberty to be sure, but a Mercedes, inverted and mounted, but they probably never flew it in a plane. There were evidently disadvantages too great to be overcome at the moment, for they did not continue the development. For the next few years, the idea germinated restlessly in certain aviation minds. Then about a year ago, the Engineering Division received orders from the Chief of Air Service to go ahead, rework and install as an inverted Liberty engine in an airplane and see what would happen.

This was done. A standard DH4 airplane was remodeled for the purpose and a standard Liberty was put through the Dynamometer Laboratory. The chief difficulty lay in the lubrication system. To prevent the oil from flowing into the distributor heads, and to obtain means for pumping it out of the camshaft housing and returning it to the oil tank, was the first problem to be overcome. A gear-type fuel pump, installed to function as an auxiliary oil pump, was used to pump the oil out of the camshaft housings. The backflow of oil into the Delco distributor heads was stopped by adapters fitted between the camshaft housing and the ignition breaker and the distributor housing assembly. Three-fourth-inch holes were drilled through the main bearing webs, in order to allow the oil to flow from one end of the crank case to the other. No changes in pistons were required to take care of the excess oil, which naturally fell to the under side of the pistons. The suction side passages of the scavenging pumps were arranged so that oil thrown off from the connecting rods and main bearings and collecting in the crank case could be carried to the scavenging pumps. No changes other than these were made in the oil pump assembly.

A few other changes were found necessary. The flow of water through the water jackets was reversed, primarily to facilitate the operation of the water piping installation. According to the tests it would seem that this reversal makes for better operation of the engine, although this fact has not yet been fully proved in flight. No difficulty was found with spark plugs fouling, due to the change in the position of the cylinders. The standard US52 Zenith carburetors were used in conjunction with inverted manifolds.

Of course, not every engine would lend itself so favorably to this inverted position, but with the Liberty, the cylinder barrels project quite a distance into the crank case, making it possible to collect oil in the upper half of the crank case proper, which in the inverted position becomes an oil sump, while what is normally the lower half of the crank case acts merely as a crank case cover and the lower half of the main bearing. It is thought that the Curtiss D12 would also be amenable to the inverted position and experiments will shortly be made to ascertain its adaptability for this purpose.

The greatest advantage of the inverted position is the decided reduction of the blind area straight ahead which is typical of the DH equipped with the Liberty. This improved visibility simplifies the landing problem to a very marked degree and is of great benefit in maneuvering. In practice or actual combat it would entirely obviate the danger of head on collisions and gives the pilot increased surety in his movements with the plane. Another great advantage lies in the possibility of a simplified fuel system. Since the carburetor is but a few inches from the engine the fuel supply could be by gravity, obviating the necessity for fuel pumps. The accessibility of the engine for working is also greatly improved as the mechanic can accomplish most of it standing on the ground.

A great deal of flying has been done with the DH equipped with the inverted Liberty and even in cross country work it has been successful. Its longest trial of this kind was made last fall when Lieut. F. O. Carroll, pilot and F. W. Hechler, observer, flew it from Dayton to St. Louis for the Pulitzer races.

In view of the success of this equipment, plans have been made to build four Liberty engines, especially designed for the inverted position and should these prove successful it is possible that the inverted engine will be adopted as standard for all corps observation and pursuit type airplanes.—*Air Service News Letter.*

AIRPORTS AND AIRWAYS

Spokane News

By E. H. Partridge

Capt. John Fancher, overseas pilot during the war, has been awarded a major's commission in the new Ninth Corps area National Guard unit being formed here. Two hangars and six planes will be erected and will be placed in services within three months. Major Fancher is recruiting his squadron.

Claude Owen, pilot for the Foster Russell Aviation Co., has taken over management of the concern, following the death of Foster Russell.

Pilot Nick Mamer, who is barnstorming through the west in California, in Seattle, and around Spokane, reports a successful season. He makes Spokane his base.

Los Angeles News

Burdett D. Fuller is in charge of the Burdett Airport. Starting early last summer and having met with considerable success this port now has a line of 9 ships including 4 Jennies, 1 K6 Standard, 1 N9, 2 TM Scouts, 1 Hisso Jennie and possibly 2 Canucks in the near future. Mr. Fuller also has more than 20 students under his instruction and several of these will soon make solo flights.

The complete personnel is B. D. Fuller, manager and proprietor; Jack Frye, pilot; Earl Chubb, pilot; Slim Marshall and Vincent Scott, mechanics.

The Rogers Airport, probably the oldest in Los Angeles, recently moved from Welshire Blvd. to Ballona and Western Ave. Jim Webster is the manager, while Eddie Bellande and "Bud" Creeth are the two pilots.

Gil Budwig, former pilot, has discarded his goggles and helmet for his radio shop in Glendale, Calif., and occasionally help to carry passengers at the port on Sundays.

Both "Fritz" Matthews, mechanic, and J. V. Sandblom, ("Sandy"), in charge of stock room, continue at the Rogers Airport.

A new commercial field is operated by the Triangle Air Service, of which E. Longbrake is owner and pilot. Longbrake has quite a few students and a good line of ships, 1 Canuck, 1 Jennie, 2 TM Scouts, 1 Martin R and 1 OX5 runabout speed job. This field is doing a nice business and we all wish them the best of luck.

The Aerograph Photo Co. of Los Angeles is a new concern specializing in aerial photography and advertising, but not much information is available at the present time. "Ace" Brauniner is their pilot.

Glendale Airport, Glendale, Calif.—Mr. Kinner of the Kinner Airplane & Supply Co., has recently tested and declared satisfactory a five passenger biplane for Dr. Young, a pilot and sportsman of Glendale. The ship is powered with a 200 hp. Renault, and is completely equipped to use for hunting and camping trips. Several Jennies, 1 Spad and 2 Canucks are also on the line.

A New DeLuxe Airplane

The Netherlands Aeroplane Works of the Fokker establishment recently completed a new large commercial airplane, Fokker type F.VII, Philip E. McKenney, The Hague, reports to the Department of Commerce. It is of the monoplane type with thick wooden wings spanning 21 meters; equipped with a Rolls Royce Eagle IX motor of 300 hp. Behind the motor is a double seat for the aviators to enable them to relieve each other. One man, therefore, may operate the plane while the other acts as navigating officer and at the same time looks after the wireless apparatus. This machine is fitted with a good wireless arrangement which makes it possible for the aviator to keep in communication at all times with aerial and other wireless stations. Behind the seats and connected with them by a wide door is a large cabin for the accommodation of eight passengers who have a free and unhampered view under the wings. The plane is further provided with a large space for the accommodation of baggage.

After having undergone a thorough test this plane was purchased by the Royal Dutch Aviation Company and within the course of a few days will form part of that company's fleet of passenger planes. It is the intention of the management of the Royal Dutch Aviation Company to order a number of these ships which will be used in the service between England and Holland.

Hamburg Seeks Strategic Air Place

Hamburg is making strenuous efforts to become a keypoint in the system of northern and central European aerial transportation which connects Germany, Holland, England, Denmark, Sweden, Russia, and Austria, Vice Consul C. B. Dyar reports. A new airdrome has recently been constructed at Fuhlsbuttel, Hamburg, which is owned by the State and is leased to a private company. The landing field is being prepared especially to handle a great amount of traffic. Efficiency experiments and tests are being made for a proposed system of communication between planes and the field and between fields. The Fuhlsbuttel field possesses up-to-date wireless equipment that has a telephonic radius of 600 km. and a telegraphic radius of 1500 km. The telegraph will be used chiefly for dissemination of meteorological intelligence and for starting and landing reports to the various airdromes, while the telephone will be used for direct communication with planes. A modern beacon, visible at a distance of 50 mi., has been erected to serve as a spotter during night flying.

At present there is a regular daily service between Copenhagen, Hamburg, Bremen, Amsterdam, and Rotterdam. The average flying time from Hamburg to Copenhagen is 2 hr., from Hamburg to Rotterdam 5 hr., from Hamburg to Bremen 1 hr., and from Copenhagen to Rotterdam 8 hr.

A feeder line, Hamburg to Hanover, connects with the Berlin-Hanover-London Air Express which leaves Berlin at 10 a. m. daily, and arrives in London at 5.30 p. m. It is also possible to connect with the Berlin-Danzig-Koenigsberg-Moscow Express which leaves Berlin at 1 p. m. and arrives in Moscow at 4.45 p. m. the next day, with an actual flying time of 15 hr.

Long Aerial Advertising Trip

Pilot Karl S. Ort, who has been advertising through the South and West during the past six months for the Manchester Cigar Co. of York, Pa., recently arrived in the latter city from Portsmouth, Ohio.

His airplane is being reconditioned in Lancaster in preparation for an extended trip through the Middle West. Pilot Ort will join Paul Redfern, another flier in the employ of the cigar company, somewhere in Ohio.

During the past sixteen months Pilot Ort has flown for the cigar company a total of 700 hr. and covered an approximate distance of 50,000 mi. This has been done without the aid of any ground organization or mechanics other than those available at the fields en route and shows what can be done with airplanes in their present state of development.

Pilot Ort left York Jan. 1 and went by airplane to Atlanta, Ga. At Atlanta he was joined by Horace Renninger, southern representative of the cigar company, who accompanied him to Jacksonville and Tampa, Fla. From Tampa, Ort went to Montgomery, Ala., and then to Birmingham. From the latter city, he advertised in all the small towns within a radius of 60 mi. Mobile was the next city visited and after completion of the publicity work there Ort went on to New Orleans, La., where he was again joined by Mr. Renninger.

and an advertising campaign was conducted during the Mardi Gras. Baton Rouge was the next stop. Ort returned eastward over the same route in March to Atlanta. After leaving Atlanta, he proceeded to Columbia, S. C., and then to Asheville, N. C. An extensive campaign followed in Tennessee, in which practically every large city, small town and hamlet in the state was visited by the airplane.

After completing the advertising campaign Ort went to Louisville, Ky., with C. C. Hillabrand, the northern sales representative of the cigar company. A publicity campaign was staged in Louisville during the Kentucky Home Coming week. Before leaving Kentucky, Ort visited Frankfort, the capitol, and Lexington. He next proceeded to Cincinnati, Ohio, then to Portsmouth, from which city he flew to York.

The accompanying illustration shows Pilot Ort flying over Nashville, Tenn., where he dropped thousands of publicity leaflets. The burst of smoke appearing behind his ship does not indicate that the municipal anti-aircraft artillery was shooting at him to keep up practice. Instead it is an "advertising bomb" fired from the ground, by means of which the attention of the public was directed to the publicity campaign. For an "Archie" this would have been pretty good shooting.

Advertising bomb exploding close to publicity plane flown by Karl Ort over Nashville, Tenn.

Sowing by Airplane

Glenn H. Curtiss has added another item to the list of practical commercial uses for airplance by making use of one of his planes in seeding the large areas of new land with tame grasses. Mr. Curtiss is associated with Jas. H. Bright in the development of cattle ranches on the newly reclaimed Florida lands.

The seed used is carpet grass, recommended by the U. S. Bureau of Plant Introduction for the special reason that the seed takes root and the grass thrives without the necessity of previous preparation of the soil or subsequent cultivation. Mr. Bright, whose successful experiments with grasses in Florida are widely known, called to mind the old method when men with hand seeders laboriously tramped the original ranch putting in grass seed after careful preparation of the soil for the purpose.

The plane carries beside the pilot one man attending to the liberation of the grass seed. The seed is dropped from the fuselage into the propeller blast at the height of 500 ft., and drops to the ground, as determined by experiments, sufficiently scattered for the purpose of seeding. The seed is very fine and as it comes from the propeller blast it has much the appearance of a cloud following in the wake of the machine. The plane crosses the tract to be sown at distances of one-sixteenth of a mile apart, which secures the distribution desired.

Booker Sport Plane

This interesting sport plane, which is shown in the accompanying illustration, was designed and built by Carr E. Booker, a native of North Carolina, and now of New York. His object in developing this little ship was to offer the public a small, inexpensive plane that could be distributed and used like an automobile.

In 1917, after ten years of study and hard work, Mr. Booker was finally ready with his first plans. After several test flights, made by Lieutenant Leazer, various improvements

Booker sport plane, with a Lawrance model A3, 25 hp 2 cyl. engine

were made in the ship. In June, 1921, the ship was christened by the daughter of the Governor of North Carolina in the presence of many notables. Subsequently work continued along lines of standardizing the parts and cutting down production costs.

The principal characteristics of the Booker sport plane are as follows: Span, upper wing, 20 ft. Span, lower wing, 16 ft. Overall length, 16 ft. 6 in. Wing curve, U.S.A. 27. Chord, 4 ft. Engine, 39 hp. Lawrance model A3, two-cylinder, horizontal-opposed, air-cooled type. Weight empty, 425 lb. Weight loaded, 775 lb. Factor of safety, 9. High speed, 70 mi./hr. Landing speed, 35 mi./hr. Cruising radius, 250 mi.

In an alternative design, for which the 60 hp. Wright model L4 three-cylinder radial engine is specified, it is expected to obtain a high speed of 90 mi./hr. and a landing speed of 40 mi./hr.

New Farman Sport Plane

The new Farman two-seater sports plane which is illustrated herewith was flown in the Zenith Efficiency Cup race, in France, a few weeks ago, by Pilot Bossontrot, who secured second place. It will be seen from the photograph, that the

New Farman sport monoplane, which finished second in the Zenith Efficiency Cup race

ship is a cantilever monoplane, with a strut braced wing of one piece. The visibility from the cockpit is excellent. The fuselage and special landing gear used on the standard Farman Sport has been retained.

The specifications of this plane are as follows:

Span, overall	26 ft.
Height, overall	6 ft. 6 in.
Length	19 ft. 6 in.
Wing area	260 sq. ft.
Motor	Anzani 6 cyl. 70-80 hp.
Gasoline capacity	20 gal.
Oil capacity	7 gal.
Weight, empty	720 lb.
Total useful load carried	630 lb.

Moscow Buys 500 Planes

Recent dispatches from Berlin state that the Russian Soviet Government has purchased large quantities of war supplies from Holland, Italy and Switzerland during the last three months, paying either cash or forest concessions in northern Russia.

The Soviets are also understood to have purchased over 500 airplanes, fifty tanks and sixty submarine chasers. The airplanes were delivered by the Fokker Co. of Holland and an Italian firm, the consignment having been forwarded to Moscow according to the dispatches.

Underwood & Underwood's Aerial Department

For the past year Underwood and Underwood's Aerial Department has been making a very successful progress, securing and delivering profitable business, and building up personnel.

At the head of the department is C. T. Underwood, with long experience in the commercial photographic business, to say nothing of his heritage from a family in the photographic business since 1882.

The sales department is headed by W. L. Hamilton, who has been continually associated with aeronautics since 1915 and has been directly associated with the production and sale of aerial photography since 1919.

In charge of the photographic and production department is Q. J. Stone, who joined the photographic section of Marine Corps in 1918 and who has been connected with aerial photography since that time. Since 1920 he has devoted his entire effort to the production of aerial surveys. The result of Mr. Stone's work is well known and has received wide publication in leading rotogravure supplements throughout the United States to say nothing of his work at Oklahoma oil fields, the Rochester Aerial Survey, the power line surveys for American Gas & Electric Co., as well as the production of some very interesting large scale maps for the Consolidated Gas Co. of New York.

In charge of the dark room and photographic laboratory, is Frank Luckert, who has been continually in the photographic business since 1910, and since 1919 has concentrated his entire efforts on the production and development of aerial photography.

Last but not least in the Aerial Department is Lieut. Lewis McSpaden, a graduate engineer from the University of California, with the U. S. Air Service in the United States and abroad, with a record of many hours piloting for photographic sections. On his return from France he became connected with the Aerial Photographic School at Langley Field, Va., and in 1919 entered the commercial field of aerial photography. Lieutenant McSpaden was the first to produce an aerial map of Manhattan Island, which marked a very definite stride of progress in the development of aerial surveys. Later McSpaden spent months cruising timber in Canada by the aerial method, after which time he returned to the States, producing miles of power line railroad and city surveys.

Farman Makes New World Altitude Records

The new Farman Goliath equipped with a single 600 hp. 18 cylinder Farman motor recently established two new world altitude records, carrying heavy loads.

For the first record the machine was flown by Pilot Conpet, who, carrying a useful load of 1,000 kg., exceeded an altitude of 15,000 ft. The former record with this load was held by the late Pilot Casale who flew a Blériot, equipped with four motors.

The second record was made in the same machine by pilot Bossontrot who attained an altitude of 15,000 ft. carrying a useful load of 2,000 kg.

It is of interest to note that this machine also carried a useful load of 3,000 kg. to a considerable altitude, but no official tests have as yet been made with this load.

These records are exceedingly interesting in view of the fact that most of the preceding records of this kind have been held by multi-motored machines. The Farman 600 hp. motor with which this machine is equipped, weighs approximately 1,000 kg. It is equipped with a propeller geared down ½ with the motor.

Belgium Wins James Gordon Bennett Cup

The International Free Balloon Classic, the James Gordon Bennett Cup Race, is now a matter of history. For thirteen years since 1906 it was competed for by selected free balloon pilots from various countries, the conditions governing the permanent award of the cup requiring a competing country to win the race for three consecutive years. Lieut. Ernest deMuyter of Belgium, by his victory in the last race which started from Brussels, Belgium, on June 15 last, clinched the cup for his country, for he was also the victor in the events for 1922 and 1923, the former starting from Geneva, Switzerland, and the latter from Brussels, Belgium. In addition to winning the cup for his country, Lieutenant deMuyter also gained the highest individual honors in the history of this international aeronautical classic, for his last victory was the fourth he had achieved for his country, he being the winner of the race which started from Birmingham, Ala., in the year 1920.

Seventeen contestants participated in the balloon classic this year, the three entrants from the United States being Capt. H. E. Honeywell, piloting the "Uncle Sam," W. G. Van Orman, piloting the "Goodyear," and Maj. Norman W. Peek, Army Air Service, piloting the latest type of Army balloon.

In the matter of victories won the United States has the highest score, winning four times. France holds the record for the greatest distance covered, for in 1912 in the competition which started from Stuttgart, Germany, A. Bienaimé covered 2191 km. The runner-up was A. R. Hawley (U.S.) the winner of the 1910 event, starting from St. Louis, with 1887.9 km.

It may be of interest here to give a summary of the results attending the twelve competitions which were held before the Belgian Aero Club became the permanent possessor of the cup. It should be stated here that due to the World War no competitions were held from 1912 to 1920. The statistics here given were furnished by the National Aeronautic Association.

WINNERS OF THE GORDON BENNETT BALLOON RACES

Year	*Starting Point*	*Winner*	*Country*	*Distance*	*Duration*
1906	Paris, France	F. P. Lahm	United States	647 km.	22 hr. 5 min.
1907	St. Louis, Mo.	O. Erbsloh	Germany	1498 "	40 "
1908	Berne, Germany	Cal. Schaek	Switzerland	1212 "	73 "
1909	Zurich, Switzerland	E. Mix	United States	1121 "	35 "
1910	St. Louis, Mo.		United States	1887.6 "	44 " 25 "
1911	Kansas City, Mo.	A. R. Hawley			
1912	Stuttgart, Germany	O. Gericke	Germany	756 "	12 " 28 "
		A. Bienaime	France	2191 "	46 "
1913	Paris, France		United States	618 "	46 " 10 "
		Ralph Upson			
1920	Birmingham, Ala.		Belgium	1700 "	40 "
		Lt. deMuyter			
1921	Brussels, Belgium		Switzerland	746 "	67 " 25 "
1922	Geneva, Switzerland	Capt. Armbruster			
			Belgium	1672 "	25 " 45 "
1926	Brussels, Belgium	Lt. deMuyter			
			Belgium	1116 "	31 "
		Lt. deMuyter			

It is hoped that the permanent award of the cup to Belgium will not mark the end of this international free balloon competition, which is always a source of world wide interest, particularly among the aeronautical element, and that some public spirited individual will offer another trophy to sustain interest in free ballooning, not only from the aeronautical standpoint but from the element of sport which it engenders, for as a sporting contest this race leaves nothing to be desired.

Newspaper repoets contain a rumor to the effect that King Albert of Belgium will offer an international cup to replace the Gordon Bennett Trophy. We hope that this will come to pass.

Bartlesville Aero Exposition

On Sept. 1 and 2 an Aero exposition will be held at Bartlesville, Okla., in which there will be $2,500 in cash prizes. The show will be under the anspices of the Chamber of Commerce and the manager is William Parker. Among the six main events is an "On to Bartlesville Race" with a first prize of $500 and second and third prizes of $200 and $100 respectively. There are prizes for the best Stunt Flier, for the best "Dead Stick Landing" and for parachute jumping. There is also to be a race of 90 mi. for planes of not more than 90 hp. and also a free for all race for two seaters.

UNITED STATES AIR FORCES

U. S. ARMY AIR SERVICE

Army Air Orders

First Lieut. Clifford Ellerman, A.S., Marshall Field, Fort Riley, Kans., to San Francisco, sailing on transport for Hawaiian Islands, Aug. 2.

Staff Sergt. Charles W. Manning, 24th Photo Section, A.S., Brooks Field, transferred to the 90th Attack Squad., A.S., Kelly Field.

Staff Sergt. Paal Symonds, 90th Attack Squad., A.S., Kelly Field, transferred to the 24th Photo Section, A.S., Brooks Field.

Orders June 13 amended to direct First Lieut. Bernard S. Thompson, A.S., to proceed to Phillips Field, Aberdeen, Md.

Capt. Raymond E. O'Neill, A.S., detailed as recorder of Examining Board, Washington.

Orders May 27 amended to direct Lieut. Col. William E. Gillmore, A.S., to proceed by rail Aug. 1 from San Francisco to Washington for duty in office of C.A.S.

First Lieut. Earle R. Strong, O.R.C., to two weeks active duty Washington, D.C.

Capt. Joseph H. Carr, O.R.C., to two weeks active duty Selfridge Field.

Maj. Charles J. Browne, Kelly Field, Tex., to Manila, P. I.

Special order No. 166 as applying to Sec. Lieut. G. F. Hix, First Lieut. G. C. Furrow, Capt. C. L. Hayward all O.R.C. revoked.

Sec. Lieut. Charles W. Gettys transferred from Kelly Field, Tex., to Coast Artillery Corps, Fort Winfield Scott, Cal.

Maj. William C. McChord designated commandant Air Service Technical School, Chanute Field, Rantoul, Ill. Vice Maj. F. L. Martin relieved.

Capt. Lester T. Miller from Brooks Field to Kelly Field, Tex.

Maj. Piercy E. Van Nostrand from Brooks Field to Kelly Field, Tex.

Special order No. 120 in as far as it concerns Lieut. E. M. Powers transfer to Hawaii is revoked.

First Lieut. E. M. Powers from Kelly Field, Tex., to Camp Nichols, Rizal, P. I.

Sec. Lieut. Henry H. Ogden, O.R.C., is relieved from detail to the 57th Service Squadron and is detailed to the 99th Observation Squadron Bolling Field.

Maj. Frederick L. Martin from Chanute Field, Ill., to Langley Field, Va.

Sec. Lieut. Morris Kelly Voedisch from Air Service, Kelly Field, Tex., to Coast Artillery, Fort Monroe, Va.

First Lieut. George H. Sauvigne and First Lieut. Arthur Wilson, O.R.C., to Middletown, Penna., for fifteen days training.

The following officers of the O.R.C. are to report at Mt. Cook Field for fifteen days training: Maj. H. W. Lake, Capt. C. L. Hayward, Capt. E. M. Kintz, First Lieuts. S. S. Evans, G. C. Furrow, James H. Kimmelberger, L. B. Imlauf, Sec. Lieuts. R. M. Hazen, V. P. Pennington.

Sec. Lieut. G. V. Dick, O.R.C., to Fairfield, Ohio, for fifteen days active service.

Maj. J. H. Larned and Sec. Lieut. W. F. Reagon, O.R.C., to Washington, D.C., for fifteen days training.

Capt. F. L. Smith and Sec. Lieut. G. F. Hix, O.R.C., to Fairfield, Ohio.

Maj. Clarence L. Tinker from Marshall Field, Fort Riley, Kans., to Langley Field, Va.

First Lieut. John M. McDonnell from Maxwell Field, Ala., to Chief of the Air Service, Washington, D.C.

Maj. Leonard H. Dreanan from office Chief of the Air Service to Post Field, Fort Sill, Okla.

Capt. L. F. Stone from Kelly Field, Tex., to McCook Field, Dayton, Ohio.

France Field Fliers Pay a Visit to Costa Rica

The early part of June saw a continuation of the cordial relations already established with the neighboring peoples of the Panama Canal Zone, when four DH planes journeyed via David, Republic of Panama, to San Jose, Costa Rica, the trip being made from France Field to San Jose in exactly 5 hr. flying. Capt. T. S. Voss, Department Air Officer, Lieutenants Carter, Curry, Amberg and Minter and Sergeants Ruef, Cattarius and Dossett, all of the 24th Pursuit Squadron, comprised the party. They were royally received by the American Minister, Mr. Davis, and welcomed by President Hernandez with his cabinet and other officials. A great crowd was present to witness the arrival of the planes. The party visited the coffee plantation near Cartago and were the guests of official San Jose at many dinners and similar functions. The return flight was made on June 11 with one stop at David, R. P., and was accomplished in 4 hr. 45 min.

Test of Radio Direction Finder

Capt. W. H. Murphy and Lt. A. J. Lyon recently made a flight from McCook Field, Dayton, Ohio, to Columbus, which proved to be the first use of the radio direction finder under actual necessity. The weather was extremely foggy and Lieutenant Lyon, the pilot, who had never flown with the aid of a radio direction finder, was not exactly sold on the efficiency of the proposition. Hence the trip was started by compass. The fog was so thick that the plane had to be kept hovering just over the tree tops. Not a land mark was visible. This, together with a variable drift wind, soon made it apparent that Columbus would scarcely be reached without some other aid. The plane was the Radio DH, P292, and as soon as the equal radio signal direction finding system was taken into confidence, the plane was set on the correct course and Columbus was reached without difficulty. There was no question as to its use on the return trip. It simply was *used*, and the result proved equally successful through as persistent bad weather and as stubborn drift winds. The compass was, of course, forgotten, as it was found to be reading incorrectly.

Captain Murphy made an interesting experiment on the return trip which leads to the idea that should two planes be traveling the same course, one, for instance, flying from Dayton to Columbus and the other from Columbus to Dayton, they could each keep slightly to the right of the course thus avoiding collision and still be led to their destinations with great accuracy.

Flying Record of the 91st Observation Squadron

During the preceding eleven months the 91st Observation Squadron of Crissy Field, now stationed temporarily at Rockwell Field, accumulated a total of 1887 aircraft hours, with an average pilot personnel of 8 officers and 4 enlisted men. The officers and enlisted men shown below have piled up the time set opposite their names, piloting aircraft on official missions: Capt. John W. Signer, 140 25; Lieut. Walter Miller, 180 15; Staff Sgt. Fred Kelly, 394 30; Staff Sgt. Cecil B. Gaile, 219 50; Staff Sgt. T. J. Fowler, 139 05; and Corp. R. H. Fatt, Jr., 350 55.

Staff Sergeant Kelly during this period was on detached service at Brooks Field, San Antonio, Tex., from Sept. 13 to Dec. 19, 1923, and his pilot book shows a total flying time between these dates of 220 35, which gives him a grand total for the period of 615 hr. 5 min. piloting aircraft and, in addition, he has spent 45 05 in the air as an aerial observer.

Staff Sergeant Gaile during this period was on detached service with the organized Reserve at Vancouver Barracks, Washington, from July 1 to Sept. 1, 1923, and his pilot book shows a total flying time between these dates of 42 45 which gives him a grand total for the period of 262 hr. 35 min.

All flights, with the exception of the necessary test flights ordered by the Engineering Officer, are made under Operations Orders for some specific purpose, and the majority of the flights made are over mountainous territory with emergency landing fields few and far between.

Air Service Cooperates in Harbor Conservation Program

Lieut. E. P. Gaines, Commanding Officer of the 7th Photo Section, Wilbur Wright Field, Fairfield, Ohio, accompanied by Sergeant Haine, of the same organization, recently proceeded to Chattanooga, Tenn., for the purpose of performing aerial photographic work for the Corps of Engineers in connection with the River and Harbor conservation program. They will remain at Chattanooga, Tenn., for several months on temporary duty.

Pioneer Work in Hawaiian Islands

The Fourth Observation Squadron, stationed at Wheeler Field, H. T., has the honor of landing the first airplane on the small Island of Lanai in the Hawaiian Group.

During the recent tour of inspection, Brig. Gen. Wm. Mitchell, Assistant Chief of Air Service, visited the Island of Lanai to secure data incident to the establishment of airways and airdromes on all Islands.

An excellent field was secured and marked, and this work was immediately followed by the 4th Squadron, all pilots and observers making the trip in formations of three planes each.

Sergeant Harvey Back at Chanute Field

Sergt. Alva Harvey, of Section "A," Air Service Technical School, Chanute Field, Rantoul, Ill., who was the mechanician of the Flagship "Seattle" on the around-the-world flight, piloted by Maj. F. L. Martin, which crashed on the side of a mountain after leaving Chignik, Alaska, returned to duty at his station. Since his return he has constantly been surrounded by his buddies who have been extending congratulations upon his safe return, and incidentally to hear a word of the hardships endured by him and Major Martin while they were lost in Alaska. There have been many calls for Sergeant Harvey's appearance before various clubs and civic organizations in all sections of the country.

A six o'clock dinner was given at the Consolidated Mess in honor of Sergeant Harvey's return to Chanute. A film, made by the Pathe Company, showing the personnel of the around-the-world flight while they were in Alaska, was an interesting feature of the evening's entertainment.

Lieutenant Castor piloted Sergeant Harvey to St. Louis, which they were guests of the Dayton Chamber of Commerce at that city. Sergeant Harvey gave an interesting account of his experiences in Alaska.

U. S. NAVAL AVIATION

Naval Air Orders

Comdr. A. C. Read, to command U.S.S. Ajax and Air Sqd. 20.

Lieut. Grover B. Turner, det. Aircraft Sqdrns., Battle Fltt. Resignation accepted to take effect Oct. 1, 1924.

Lieut. Theodore S. Culbohrn (SC), det. Naval Air Sta., Coco Solo, C. Z., to U.S.S. Jason.

Lt. (jg) Dwight H. Wilson, det. Rec. Ship, San Francisco, Calif., to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Lt. (jg) Albert Noble, det. U.S.S. Florida; to aid on staff, Comdr. Fl. Base Force.

Lt. (jg) Emanuel C. Beck, det. U.S.S. Concord, to temp. duty under instr. in aviation, Naval Air Station, Pensacola, Fla.

Ens. Wiley H. Hand, det. Rec. Ship, San Francisco, Calif.; to temp. duty under instr. in aviation, Naval Air Sta., Pensacola, Fla.

Ens. William D. Johnson, det. U.S.S. Newport News; to temp. duty under instr. in aviation, Naval Air Station, Pensacola, Fla.

Ens. Robert H. Smith, det. Rec. Ship, San Francisco, Calif., to temp. duty under instr. in aviation, Naval Air Sta., Pensacola, Fla.

Ens. James B. Vost, det. Rec. Ship, San Fran. Cal.; to temp. duty under instr. in aviation, Naval Air Sta., Pensacola, Fla.

Lt. (jg) John G. Burrow, det. U.S.S. Oklahoma; to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Lieut. George E. Duffy (SC), det. 15th Nav. District; to Naval Air Station, Coco Solo, C. Z.

Ens. Daniel W. Harrigan, det. U.S.S. Brooks; to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Lieut. Tyler W. Spear (DC), det. Nav. Med. Sch., Washington, D. C.; to Naval Air Sta., Lakehurst, N. J.

Lieut. Armin T. Fellows (DC), det. Naval Air Sta., Lakehurst, N. J.; to Naval Med. Sch., Washington, D. C.

Ens. Alfred R. Mead, det. U.S.S. Sands, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Lieut. William J. Hart, det. Office, Gen. Insptr. of Nav. Aircraft, Garden City, Long Island, N. Y., to Insptr. Nav. Aircraft, Glenn L. Martin Aircraft Corp., Cleveland, Ohio.

Ens. Vernon Huber, det. U.S.S. Seattle, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Lieut. Ray W. Byrns (SC), det. U.S.S. Cuyama; to Naval Air Sta., Pearl Harbor, T. H.

Ens. Warren K. Berner, det. U.S.S. California, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Ens. Buell F. Brandl, det. U.S.S. Seattle, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Ens. Delbert S. Cornwell, det. U.S.S. Idaho, to temp. duty under instr. in aviation Nav. Air Sta., Pensacola, Fla.

Ens. Herbert S. Duckworth, det. U.S.S. Idaho, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Ens. Daniel A. Frost, det. Nav. Air Sta., Pensacola, Fla., to c.f.o. U.S.S. Marblehead.

Ens. Tom B. Hill, det. U.S.S. Idaho, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Ens. William B. Whaley, det. U.S.S. Idaho, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Ens. Eaton A. Boothe, det. U.S.S. Mississippi, to Naval Air Sta., Pensacola, Fla., for temp. duty under instr. in aviation.

Ens. Alfred R. Taylor, det. U.S.S. Arnoslook, to temp. duty under instr. in aviation, Nav. Air Sta., Pensacola, Fla.

Lt. Comdr. Stanley D. Hart (MC), det. U.S.S. Chaumont, to Naval Air Sta., Lakehurst, N. J.

Comdr. Ben D. McGee (SC), det. Nav. Supply Stu., N.O.B. Hampton Rds., Va., to Aircraft Sqd., Scty. Fleet.

Lt. Comdr. Elwood A. Cobey (SC), det. Aircraft Sqd. Scty. Flt., to Navy Dept.

Lieut. John C. Williams, det. Aircraft Sqdrns., Scty. Flt., to Naval Air Sta., N.O.B. Hampton Rds., Va.

Lt. (jg) Horton L. Booker, det. Aircraft Sqdrns., Scty. Flt., to Naval Air Sta., N.O.B. Hampton Rds., Va.

Lt. (jg) Clarence M. Head, det. Aircraft Sqdrns. Battle Flt., to U.S.S. Tennessee.

CS2 in Air 15 hr. 19 min.

A service test to determine the flying duration radius of the Navy seaplane CS2 powered with the Wright T3 was held at the Naval Air Station at Anacostia from July 12 to the next morning. The CS2, piloted by Lieuts. Frank W. Wead and John D. Price, both U.S. Navy, took to the air at Anacostia at 3:26 in the afternoon. The plane carried 690 gal. of gasoline in her tanks. The flight lasted until 6:45 July 13, when, because of heavy fog that hid the river and the surrounding terrain from the pilot the plane landed. Fuel for approximately 5 hr. of additional flight remained in the tanks upon landing. The plane was in the air for 15 hr. 19 min., which constitutes a world's record for non-stop seaplane flying duration. Approximately 1050 mi. was covered in the flight, which distance is also a record for seaplanes.

Schedule for Shenandoah

The Chief of Naval Operations has approved the following tentative schedule of employment for the Shenandoah, which is now engaged in training flights and in flights for securing data on speed, engines, and pressure distribution.

The U.S.S. Shenandoah will report, about Aug. 1 to the Commander of the Scouting Fleet for the purpose of holding experiments with the U.S.S. Patoka to determine the feasibility of mooring to, basing on and fueling from a mobile base. These experiments will be held in Narragansett Bay area, including Long Island Sound. The Commanding Officer

of the Shenandoah will be authorized to proceed with the vessel under his command to the Naval Air Station, Lakehurst, N. J., at discretion whenever in his opinion this becomes necessary.

Upon the completion of the tests with the Patoka, the Shenandoah will be available for scouting problems under the direction and in conjunction with the Commander Scouting Fleet for the remainder of the calendar year, with the exception of the month of October when the Shenandoah will make a practice flight to the West Coast and return.

The schedule from Aug. 1 to Jan. 1 is as follows.

Aug. 1 to 7—Operations with Scouting Fleet.
Aug. 8 to 21—Calibrations of radio compass.
Aug. 22 to 31—Operations with the Scouting Fleet.
Sept. 1 to 7—Calibrations of radio compass.
Sept. 8 to 15—Operations with Scouting Fleet.
Sept. 15 to 30—Overhaul preparatory to flight to West Coast.
Nov. 1 to 8 Operations with Scouting Fleet.
Nov. 7 to Dec. 31—Overhaul preparatory to maneuvers in Pacific with the United States Fleet in January and February, 1925.

New Landing Field at Baguio, P. I.

A new landing field had just been completed at Baguio, Mountain Province, P. I. Captain Eglin, Lieutenants Maxwell and Hackett recently landed at this field and found it in splendid condition.

Capt. Heinen Leaves Navy

Capt. Anton Heinen, associate of Count Zeppelin in the development of the rigid type of dirigible, is no longer connected with the United States Navy. As a civilian employee of the Navy Captain Heinen supervised construction of the Shenandoah and then attracted attention by the part he played in saving her from destruction and guiding her back to her station when she was torn from her mooring mast during a storm last January and sailed in a wild flight over New Jersey, Staten Island and surrounding territory.

No official announcement has been made of the Navy Department not desiring to renew the contract under which Captain Heinen had been employed. It was stated in Lakehurst that a new contract had been prepared with the approval of the officers at the local station, but that it was rejected in Washington. The old contract expired July 1.

PUBLISHER'S NEWS LETTER

Whether or not it is the approach of "dog days" or just a general feeling of dissatisfaction and unrest in aeronautical circles, it is evident that almost every one seems to be discontented and in conversation and correspondence is giving vent to their indignation or dissatisfaction. AVIATION is criticized in official circles for printing what everyone talks about but is not put in cold type often. On the other hand, we are urged as the only aeronautical paper that discusses aeronautical policy from an independent viewpoint to print facts when they are discussed generally. It has been our experience that many of the persons who are willing to talk freely are reluctant to have anything appear which could be traced to them directly or indirectly. They seem perfectly willing that AVIATION should take the responsibility, blame and criticism for mentioning matters that they should be willing to discuss openly and frankly. Just a few of these conversations may make clear the kind of comment we refer to.

* * * *

"Have you heard of the outrageous handling of the Barling Bomber? The Air Service have left this $300,000 ship out in the open weather for two years and now are spending $50,000 to put it in shape for the Dayton races. If it ever had any military value, that has long since gone and it is an awful waste of much needed funds to pay for keeping this ship at Dayton where it could not be in a hangar, instead of in one of the airship hangars. I wonder if this so called Bomber ever carried a bomb."

* * * *

"What do you hear of the Congressional Investigation Committee? They say in Washington that the Committee made a false start and instead of investigating aircraft, is having some of its own activities investigated. The members who seem to be a very excellent group have come to realize that this investigation is not to be a 'junket' but a real clean up of the aviation situation. Guess they intend to hold off serious work until after election."

* * * *

"That's a good story going the rounds in Washington about Smith's complaint about being held back by red tape. Having been held back by all kinds of weather, he and the other boys are sore because they are being held back by red tape so that the Navy ships can refuel. They must feel like a circus trapeze performer who is sitting on the bar holding up the show while a net is being spread under him."

* * * *

"Your letter to the Board of Governors in reply to the Admiral who is scolding everyone is just the kind of a wallop coming to him. I feel sorry for all the good money Howard Coffin wasted on this job. The trouble with electing a financial angel to the presidency of the N.A.A. is that they don't lead. You can't delegate leadership to "George." There is nothing to this chapter business. They don't function, they don't even organize. The whole state and chapter machinery of the N.A.A. is cumbersome and impractical. You have got to sell membership in an association that gives no tangible return, just as you have to sell life insurance, and it takes 'gol durn' good salesmanship to put it over. A dollar a year is plenty to charge for membership in an association that gives only an intangible return; it is too much for an association that has done as little as the N.A.A. has done this year."

* * * *

"The best joke going the rounds in Washington is about the naming of the Shenandoah. Someone told someone else that Shenandoah meant 'Daughter of the Stars' and our great dirigible was christened with that impression in mind. Now some Indian sharp says the name has nothing to do with the sky or the stars. But what's in a name anyway?"

* * * *

"The air fleet here seldom leaves port for none of the owners fly themselves except Bill who is yet painfully learning and may startle the world at a later date if he doesn't side slip from the news columns into the obituary notices. From the foregoing you will see that the position of a correspondent here is somewhat similar to that of a naval writer who was sent to the Sahara Desert to report the arrivals and departures of battle-ships. A phrase coined by the War Department accurately describes the situation here—'All is quiet in this sector.'"

* * * *

Such irascibility as is shown in these and many other comments must be just a plain case of "dog days."

A Suggested National Air Policy

That a National Aviation Policy is needed by the United States is obvious. To get such a policy in concrete form AVIATION *requested several thoughtful friends of aeronautical progress to make suggestive and constructive recommendations. Some of them are given below and will be printed each week with additions, omissions and such other changes as appear to be helpful toward the formulation of a sound national air policy. Readers of* AVIATION *and others can render no greater service to the cause of aeronauticol progress than contributing their comments and suggestions.*

GOVERNMENTAL.

A continuing program of aircraft development both governmental and commercial.
A civilian, charged with championing a national air policy, is needed in the Government.
Aircraft committees in the House and Senate to hold aircraft hearings where civilians as well as government officials can express their opinions.
A detailed aircraft budget for all Governmental Departments, and an annual statement of all expenditures.
An experienced staff of flying officers at the head of all governmental air defense services.
Coordination of all procurement and experimental aircraft work of the government under one agency.
Limitation of government manufacture to repair of aircraft and specialized work that cannot be done by private firms.
The elimination of the duplication of aerial functions and facilities by government departments.
A country wide Air Mail system of trunk lines connecting the principal cities of the country.
Establishment of a National Airway System through cooperation of the Federal Government with States and Cities.
A national aircraft law that will regulate aviation, administered by practical pilots and experienced aeronautical engineers.
Membership of the United States in the International Convention for Air Navigation.

COMMERCIAL AIRCRAFT OPERATION.

Creation of commercial air lines by private enterprise or government subsidy.
Encouragement of participation by private companies in aircraft races and competitions.
Encouragement of the training of pilots by civilian schools.
Creating an Esprit de Corps among flying men all over the country by frequent gatherings at aviation meets.

INDUSTRIAL AIRCRAFT CONSTRUCTION.

Recognition that a sound aeronautical industry is a prime necessity of our National Defense.
An active industrial association that will coordinate the aircraft industry and defend it from attack.
Encouragement of the designing of new types of aircraft by manufacturers by allowing them to retain their proprietory rights.
Concentration of manufacturing firms on specialized types of army and navy aircraft.
Encouragement of research by constructors, universities and other agencies as well as by the government.
Encouragement of an annual design competition for commercial aircraft.

CIVILIAN.

A national aeronautical organization composed of public spirited citizens that will take a strong position of leadership on national aeronautical policy.
An Annual Aviation Week during which the country will think of aerial progress.
The formation of local aero clubs by fliers for the purpose of stimulating flying in all localities.
Encouraging the public to fly and patronize the air mail and transport facilities.

The Aircraft Service Directory

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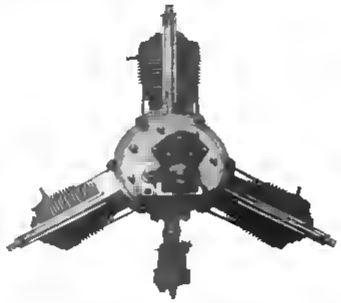

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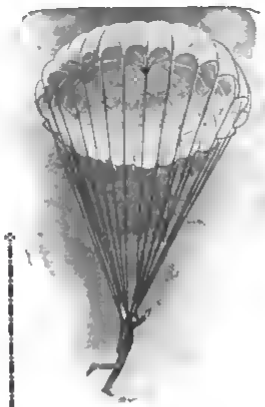

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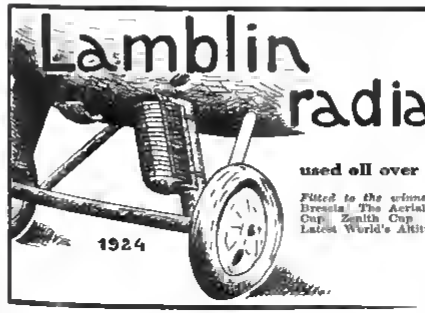

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